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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,410

06/26/2006

Takuya Tsukagoshi

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08/21/2009

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EXAMINER

CALLAWAY, JADE R

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,410	Applicant(s) TSUKAGOSHI ET AL.	
	Examiner JADE R. CALLAWAY	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/15/09, 6/15/09.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,10,11 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10,11 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/15/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendments to the claims, in the submission dated 5/15/09, are acknowledged and accepted.

Response to Arguments

2. Applicant's arguments filed 5/15/09 have been fully considered but they are not persuasive. Applicants argue that the prior art cited does not suggest or disclose "exercising control so that the object beam in the object optical system is reflected in a non-exposure direction so as not to be incident on the holographic recording medium when necessary." The Examiner notes that the full limitation relating to exercising control of the beam is "so that the object beam in the object optical system is reflected in an exposure direction so as to be incident on the holographic medium *or* in a non-exposure direction so as not to be incident on the holographic recording medium selectively" (emphasis added). The claim is written in such language that either the first or second portions of the limitation can be fulfilled to meet the claimed limitations. In this instance, Newswanger et al. disclose: "exercising control so that the object beam in the object optical system is reflected in an exposure direction so as to be incident on the holographic medium" (e.g. figure 1, col. 9, line 58 to col. 11, line 19).

Applicants also argue that Long does not disclose "recording data pages by N exposures for each data page at (N+1) levels of gradation with respect to each of areas of the recording layer corresponding to a single pixel of the data page." The Examiner respectfully disagrees and notes that the limitation was rejected under 35 U.S.C. 103,

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not 35 U.S.C. 102 and that the Examiner is relying on the combination of Newswanger et al. and Long to teach the claimed limitations. In addition, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this instance, Newswanger et al. disclose recording data pages by N exposures for each data page at (N+1) levels of gradation with respect to each of areas of the recording layer [col. 6, line 53-col. 7, line 10]. Newswanger et al. disclose that the holographic recording material can be exposed multiple times (e.g. N times) for each data page (e.g. one portion of the holographic material) at different gradation levels (due to the multiple pulse exposure recording). Long is relied upon to teach an exposure apparatus (e.g. figures 6-7) wherein each of the areas of the recording layer can correspond to a single pixel of the data page [0072, 0078-0085]. In addition a person of ordinary skill in the art at the time the invention was made would have been motivated to modify the device of Newswanger et al., as taught by Long, in order to very accurately control the shape of the exposure area so that the data can be unique for each exposure area.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 1, 3-5 and 16 are rejected under 35 U.S.C. 103(a) as unpatentable over Newswanger et al. (6,806,982) in view of Long (2001/0013959).

Consider claims 1 and 16, Newswanger et al. disclose (e.g. figure 1) a holographic recording method for irradiating a layer of a holographic recording medium (RP, recording plate) with an object beam and a reference beam through an object optical system (130, object beam optical system) and a reference optical system (140, reference beam optical system) respectively, so that a data page is of interference fringes, the method comprising: exercising control so that the object beam in the object optical system is reflected in an exposure direction so as to be incident on the holographic recording medium (by means of reflection type SLM); recording data pages by N exposures (via multiple pulse exposure recording) for each data page (e.g. one portion of the holographic recording medium) at (N+1) levels of gradation, with a single exposure time t_1 given by dividing t_0 by N, where t_0 is an exposure time necessary for exposing one of the areas of the recording layer corresponding to a single pixel of the data page as much as approximately 100% and N is an integer of not less than 2; and exposing the area as much as approximately 100% by exposure of N times, as much as 0 by exposure of 0 times and as much as more than 0% and less than 100% by exposure of between 1 and (N-1) times; and the object beam is pulsed (110, pulsed laser) to make a pulsed exposure for the single exposure time t_1 by means of a pulsed light emission from a light source of the object beam and the reference beam [col. 6, lines 53-67, col. 7, lines 1-10, col. 8, lines 21-67, col. 9, lines 1-67, col. 10, lines 1-67, col. 11, lines 1-19]. However, Newswanger et al. do not disclose that each of the areas

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of the recording layer corresponds to a single pixel of the data page. Newswanger et al. and Long are related as holographic devices. Long teaches (e.g. figures 6-7) an exposure apparatus wherein each of the areas of the recording layer can correspond to a single pixel of the data page [0072, 0078-0085]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Newswanger et al., as taught by Long, in order to very accurately control the shape of the exposure area so that the data can be unique for each exposure area.

Consider claim 3, the modified Newswanger et al. reference discloses (e.g. figure 1 of Newswanger et al., and figures 6-7 of Long) a holographic recording method wherein the object beam is pulsed (110, pulsed laser) to make a pulsed exposure for the single exposure time t_1 by means of a pulsed light emission from a light source of the object beam and the reference beam [col. 8, lines 44-67, col. 9, lines 1-33 of Newswanger et al.] and by intermittent interruption of an optical path of the object beam (via, 52 shutter of Long) [0085 of Long].

Consider claim 4, the modified Newswanger et al. reference discloses (e.g. figure 1 of Newswanger et al.) a holographic recording method wherein the reflection of the object beam in the exposure direction or in the non-exposure direction is controlled pixel by pixel using a micromirror device (e.g. reflective type SLM or LCD) having an array of micro mirrors corresponding to the respective pixels of the data page [col. 9, lines 58-67, col. 10 lines 1-16]. The micromirrors being switchable and controllable (via a computer system not shown) in the direction of reflection is seen to be inherent in the prior art device. Long also discloses (e.g. figures 6-7) an LCD that has individually

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addressable elements that can correspond to each pixel of the display [0071 of Long].

The modified Newswanger et al. reference also discloses (e.g. figure 1 of Newswanger et al., and figures 6-7 of Long) a holographic recording method wherein the object beam is pulsed (110, pulsed laser) to make a pulsed exposure for the single exposure time t_1 by means of a pulsed light emission from a light source of the object beam and the reference beam [col. 8, lines 44-67, col. 9, lines 1-33 of Newswanger et al.] and by intermittent interruption of an optical path of the object beam (via, 52 shutter of Long) [0085 of Long].

Consider claim 5, the modified Newswanger et al. reference discloses (e.g. figure 1 of Newswanger et al.) a holographic recording method wherein a beam intensity distribution of the object beam immediately before the reflection is divided into $(N+1)$ levels of areas; and the number of times of exposure for the time t_1 within the exposure time t_0 is controlled with respect to each of the areas so that the object beam after the reflection has a generally-uniform beam intensity distribution (multiple pulse exposure recording) [col. 6, lines 53-67, col. 7, lines 1-10, col. 9, lines 40-67, col. 11, lines 1-19].

5. Claims 6-8, 10-11, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newswanger et al. (6,806,982) in view of Long (2001/0013959) and Mui (2003/0117615).

Consider claim 6, Newswanger et al. disclose (e.g. figure 1) a holographic recording apparatus (100, hologram recorder) comprising: a laser light source (110, pulsed laser); a first polarizing beam splitter (C1, beam splitter cube) for splitting a laser beam from this laser light source into an object beam and a reference beam; an object

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optical system (130, object beam optical system) for introducing the object beam to a holographic recording medium (RP, recording plate); and a reference optical system (140, reference beam optical system) for introducing the reference beam to the holographic recording medium (RP, recording plate), wherein the object optical system includes: a second beam splitter (C2, beam splitter cube) for transmitting or reflecting the object beam; a reflection type spatial light modulator (SLM) capable of intensity-modulating the object beam transmitted through this second beam splitter with respect to each of pixels of a data page to be recorded, and reflecting it in an exposure direction toward the second beam splitter or in a non-exposure direction different thereto selectively; the object beam reflected by the reflection type spatial light modulator and the second beam splitter interferes with the reference beam in the holographic recording medium, and the reflection type spatial light modulator is configured so that it is capable of making N exposures of each data page (via multiple pulse exposure recording) and capable of most N times of reflection with respect to each of the areas of the recording layer within an exposure time t_0 , where t_0 is the exposure time necessary for exposing an area of the recording layer corresponding to a single pixel of the data page as much as approximately 100%, a single exposure time t_1 is given by dividing t_0 by N, and N is an integer of not less than 2, the reflection type spatial light modulator being further configured to expose the area as much as approximately 100% by exposure of N times, as much as 0% by exposure of 0 times, and as much as more than 0% and less than 100% by exposure of between 1 and (N-1) times [col. 6, lines 53-67, col. 7, lines 1-10, col. 8, lines 21-35, col. 9, lines 40-67, col. 11, lines 1-19]. However, Newswanger et al.

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do not disclose that each of the areas of the recording layer corresponds to a single pixel of the data page or that the second beam splitter is a polarizing beam splitter or a quarter-wave plate is arranged on an optical path between the second polarizing beam splitter and the reflection type spatial light modulator. Newswanger et al. and Long are related as holographic devices. Long teaches (e.g. figures 6-7) an exposure apparatus wherein each of the areas of the recording layer can correspond to a single pixel of the data page [0072, 0078-0085]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Newswanger et al., as taught by Long, in order to very accurately control the shape of the exposure area so that the data can be unique for each exposure area.

However, the modified Newswanger et al. reference does not disclose that the second beam splitter is a polarizing beam splitter or a quarter-wave plate is arranged on an optical path between the second polarizing beam splitter and the reflection type spatial light modulator. Newswanger et al., Long and Mui are related as holographic devices. Mui teaches (e.g. figure 3) a quarter-wave plate (46) arranged on an optical path between a polarizing beam splitter (48) and a reflection type spatial light modulator (44) [0027]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the apparatus of the modified Newswanger et al. reference to include a quarter-wave plate and second polarizing beam splitter, as taught by Mui, in order to select the correct polarization to be used in the apparatus for holographic recording.

Consider claim 7, the modified Newswanger et al. reference discloses (e.g. figure 1 of Newswanger et al.) a holographic recording apparatus wherein the reflection type spatial light modulator (SLM) is made of a micromirror device having an array of micromirrors corresponding to the respective pixels of the data page [col. 9, lines 58-67, col. 10, lines 1-16 of Newswanger et al.]. The micromirrors being switchable and controllable (via a computer system not shown) in the direction of reflection is seen to be inherent in the prior art device.

Consider claim 8, the modified Newswanger et al. reference discloses (e.g. figure 1) a holographic recording apparatus wherein the laser light source (110, pulsed laser) is capable of pulsed light emission with a specified pulse width [col. 8, lines 44-67, col. 9, lines 1-67, col. 11, lines 1-16 of Newswanger et al.]. However, the modified Newswanger et al. reference does not disclose that the light source is pulsed with a pulse width that is generally the same width as the single exposure time t_1 of the reflection type spatial light modulator. Note that the Court has held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation; see **In re Aller, 220 F.2d 454, 456, 105 USPQ 223, 235**. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to set the pulse width to be the same width as a single exposure time t_1 to the reflection type spatial light modulator, in order to increase the diffraction efficiency of recorded holograms.

Consider claims 10-11, the modified Newswanger et al. reference discloses (e.g. figures 1, 7 of Long) a holographic recording apparatus further comprising a control unit

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(52, shutter and computer of Long) for controlling the number of times of exposure within the exposure time to with respect to each of the pixels of the reflection type spatial light modulator, and wherein the control unit is configured to control the number of times of exposure within the exposure time to pixel by pixel so that a beam intensity distribution after the reflection by the reflection type spatial light modulator becomes generally uniform (by multiple pulse exposure recording of Newswanger et al.) [0045-0046, 0056, 0084-0085 of Long; col.6, lines 53-67, col. 7, lines 1-10 of Newswanger et al.].

Consider claims 13-15, the modified Newswanger et al. reference discloses (e.g. figures 1-7 of Long) a holographic recording apparatus wherein the control unit (52, shutter and computer) is configured to control the number of times of exposure so that the object beam after the reflection becomes generally uniform in intensity, based on beam intensity distribution information on each area when the beam intensity distribution of the object beam immediately before incident on the reflection type spatial light modulator is divided into (N+1) levels of areas (by means of multiple pulse exposures of Newswanger et al.) [0045-0046, 0056, 0084-0085 of Long].

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JADE R. CALLAWAY whose telephone number is (571)272-8199. The examiner can normally be reached on Monday to Friday 6:00 am - 3:30 pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JRC
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